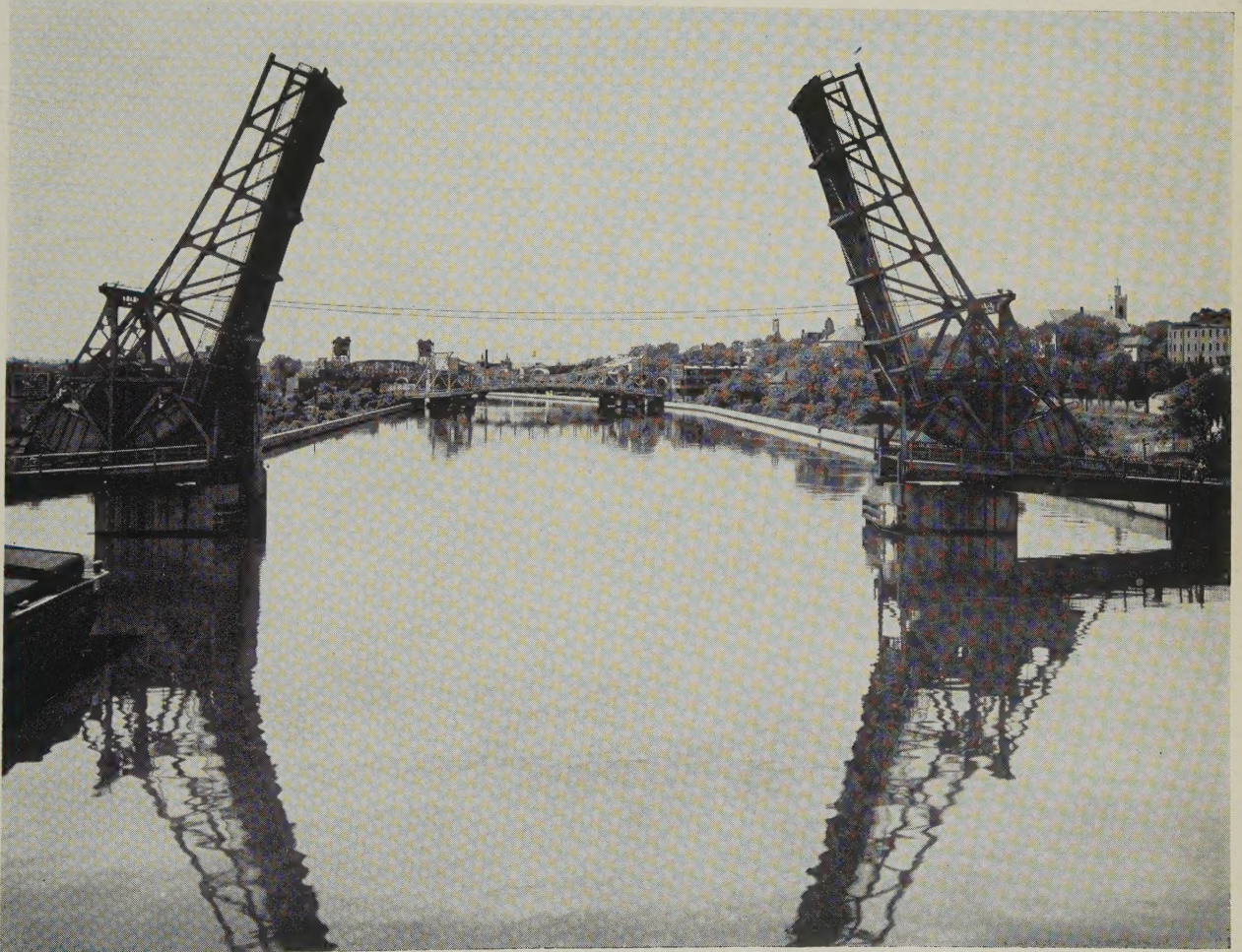




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(See page 2)

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THE ILLINOIS ENGINEER, MAY, 1953—VOLUME XXIX, NO. 5

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ILLINOIS ENGINEER: W. A. OLIVER, Editor-in-Chief; H. E. BABBITT, Associate Editor

Of Professional Interest

THE ILLINOIS ENGINEER—THIS MONTH

May 30th—Memorial Day

Memorial Day, inaugurated in 1868 by General John A. Logan for the purpose of decorating the graves of the Civil War dead, was for many years sponsored by the G. A. R. — Grand Army of the Republic. Many of us are able to remember the parades in which these very old soldiers took part. Later, of course, the veterans of the First World War were included. But with the G.A.R. veterans no longer taking part in the activities, the original meaning of Decoration Day is apt to be forgotten.

Among the reminders of the early significance of the celebration are the poems of Walt Whitman, one of the earliest of the true Voices of America. He is in the group which includes Mark Twain, James Whitcomb Riley, Bret Harte, and later, of course, Carl Sandburg.

Whitman wrote many poems dealing with the Civil War and its aftermath, among them several concerning the death of President Lincoln. The best known of this last group is, "O Captain! My Captain!" The following brief poem is less well known but just as significant.

THIS DUST WAS ONCE THE MAN

(First published in 1870)

This dust was once the Man
Gentle, plain, just and resolute —
under whose cautious hand,
Against the foulest crime in history
known in any land or age,
Was saved the Union of These States.

W. A. OLIVER, *Editor*

LEE I. OSBORN NEW NATIONAL DIRECTOR

The Board of Direction at their meeting of March 28, last elected Lee I. Osborn as National Director to take the place of W. A. Oliver who has served for the past eight years. G. L. DeMent of the Chicago Chapter was elected to serve a second term.

The next meeting of the national board will take place at the time of the N.S.P.E. Annual Meeting on June 18-20 at Daytona Beach, Florida.

COST OF LIVING INDEX

The correction factor to be applied to the I. S. P. E. Schedule of Minimum Fees and Salaries was 188.8 for March, 1953. The factor is based upon the U. S. Department of Labor's most recent Consumer Price Index.

I hold every man a debtor to his profession;
from the which as men of course do seek to receive
countenance and profit, so ought they of
duty to endeavor themselves by way of amends
to be a help and ornament thereunto.

Sir Francis Bacon

PRESIDENT'S MESSAGE

The hospitality which was displayed at the Convention at Rock Island was more than the word expresses. The members of West Central Chapter were gracious and considerate hosts to a well-planned Convention.

The many reports, exciting oratory, good-fellowship parties, business meetings, banquet and entertainment are now memorable history. We are well into the new term with full steam ahead.

At the start of a new term, the full efforts of your officers are always needed to get the various functions and committees in operation. The main thing is to accelerate the many important phases of our activities.

A letter to stimulate the activities of the Society has been directed to all members of the State Committees and to all Chapter Officers, via their Committee Chairmen and via their Chapter Presidents. Certain excerpts of that letter, which are the concern of all the members, are as follows:

Look over each heading of the list of committees that appears on the inside cover of this magazine. Somewhere within that list of committees, you will find that channel for exploiting the dynamic ideas of a great number of our members. You, individually, have the interest of the Society at heart. Each of your committees is comprehensive. They look to you for the stimulant. Direct your ideas and your professional problems to the Chairman of the proper committee. They are receptive to constructive suggestions from all. The backbone of our Society is made up of our standing committees.

I urge those who are not entirely familiar with the many values of the Society to acquaint themselves through the use of your Chapter-Officers' handbooks, the many brochures of our State and National Societies, the numerous bulletins issued by the office of the Executive Secretary (which are received by your Chapter Officers) and the American Engineer and Illinois Engineer. The information is near you. I find we are all enlightened as to the great amount of work that is being done for our profession, if we delve into the at-hand information.

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READ THE ADVERTISEMENTS

SUBSCRIPTION RATES

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The Chapter-State relationship is not a one-way street. The membership-at-large is requested to direct suggestions to your State Society officers and committees. As a matter of historical fact, the great majority of improvements in the Society's operations have originated at the Chapter level. It is only by passing suggestions upward that they can be given general circulation for the benefit of all. Your State Officers appreciate critical and constructive letters from the membership.

Let us work hand-in-hand with our Chapter and State Officers and Committees.

RAYMOND G. BRICHLER, *President, I.S.P.E.*

VOX SECRETARII

Executive Secretary Roberts

Ladies' Auxiliaries

On January 8, 1952 the ladies of Central Illinois Chapter held their initial meeting and the installation of officers of Unit Number One of Ladies' Auxiliaries of the Illinois Society. On May 9, 1953, the ladies of St. Clair Chapter held their Charter Night to complete the organization of Unit Number Two. The gala event was a combination organization meeting, charter signing ceremony and social affair with dinner followed by dancing and was held at the Elks Club in Belleville. The Society's best wishes for a happy, helpful and interesting life go with St. Clair Unit Number Two Ladies' Auxiliary.

In order to help and guide ladies from other Chapters toward organization, President Brichler has appointed a Ladies' Auxiliary Committee consisting of Chairman Manuel Garcia, Floyd Troxel and Harry Cordes.

68th Annual Meeting

Kipling said it:

"The tumult and the shouting dies;
The Captains and the Kings depart;
Still stands Thine ancient sacrifice,
An humble and a contrite heart."

Erratum

In this column in the November, 1952, issue appeared the following statement: "During the last 12 years, the trend has been toward a more specialized training and the trend has progressed so far that today there is very little time for the engineering student to select courses other than those in his own college." Information comes from the Dean's Office of the College of Engineering, University of Illinois, that this is not a true statement of the situation at the U. of I. Not only is the undergraduate engineer encouraged to seek courses "South of Green Street," but he is required to take at least six hours of work in campus colleges other than Engineering. Also, the pendulum seems to be swinging toward a "more rounded" education in several other colleges of engineering.

Legislative

H.B. 292 has passed the House and is on first reading in the Senate. H.B. 451 is recommended to pass and

H.B. 490 is in sub-committee of the License and Miscellany Committee as this article is being written. These three bills are of particular interest to professional engineers and the Illinois Society. However, the Legislative Action Committee and the Registration Laws Committee are working with the Illinois Engineering Council in the interests of the Society on all three bills.

Miscellany

A large dinner in the Illini Union Ball Room honoring Dean Harvey H. Jordan for his forty-two years' service in both civic and academic affairs in Urbana is to be given on May 15. He has been an active, faithful member of Champaign County Chapter since 1934. A salute to Dean Jordan. . . .

COVER PICTURE

The cover picture on this issue of the ILLINOIS ENGINEER shows a series of movable bridges over the Illinois Waterway at Joliet. These bridges with the exception of the vertical lift railroad structure in the background were built and are maintained by the Illinois Division of Waterways.

The jurisdiction of the Division of Waterways under the Department of Public Works and Buildings, "extends to public waterways (rivers, streams, lakes, canals, etc.) as defined by an act of the Illinois State Legislature entitled, 'An Act in relation to the regulation of the rivers, lakes and streams of the State of Illinois, approved June 10, 1911, and amended July 20, 1939 (Section 18).'"

The Legislative Act just mentioned states in part as follows:

"Whenever the terms public waters, public bodies of water, or streams and lakes are used or referred to in this Act, they shall be construed to mean all open public streams (except as to any sanitary district channel now constructed or being constructed) and lakes capable of being navigated by watercraft, in whole or in part, for the commercial uses and purposes, and all lakes, rivers, and streams which in their natural condition were capable of being improved and made navigable, or that are connected with or discharge their waters into navigable lakes or rivers within, or upon the borders of the State of Illinois, together with all bayous, sloughs, backwaters, and submerged lands that are open to the main channel or body of water and directly accessible thereto."

The Division of Waterways not only has charge of the bodies of water as listed in the act but also, of all the structures — bridges, locks, etc. — appurtenant thereto.

During recent years the Division in cooperation with the Corps of Engineers, Department of the Army has been making some very interesting studies of beach erosion on Lake Michigan. (See cut.)

We are glad to be able to give this partial picture of the activities of one of our state governmental organizations which employs a number of professional engineers.

LAKE MICHIGAN BEACH EROSION STUDIES



DUKW and Field Crew

OPEN LETTER FROM MEMBERSHIP COMMITTEE

To all members of I.S.P.E.

Dear Member :

The Membership Committee is writing this letter as a plea to each and every member of I.S.P.E. to put his shoulder to the wheel and get our membership drive rolling forward. At the present time, we are not only standing still, we are rolling backward. Our committee report at the 68th Annual Meeting shows a loss of 50 members for 1952. This is something the Society cannot long endure. Ten chapters reported losses, five chapters reported gains, and one chapter held its own.

The organization can never become the qualified spokesman for engineering unless it can present a show of strength, and by that is meant a large membership. If we do not grow, we shall soon fade out of the picture as qualified to speak for the engineering profession at large. Do we want that to happen? The answer, of course, is *no!* But do we hear you say, "What can I do about it?" Well — you as a member can do plenty to help build up the overall membership. Here is how it can be done — *work!* Each and every member should make it his duty to work on and bring in *just one new member*. Does that sound too hard? The answer should be "NO."

There are several ways of gaining members, and each man can and should try all — even to the extent of bringing in more than one member.

1. Bring in your affiliate members. They can and should join the State and local organization.
2. Bring in the student (sub-professional), if you are

located in a town which has an engineering school. He is entitled to state and local membership and will be the backbone of the organization when we get too old to handle the affairs of the Society. In fact, we need the student member.

3. Bring in the engineer-in-training. This should be our most fertile field. *He can belong* — to the National, State, and local Society. This is the man we should cultivate. Do you have men in your organization who are qualified? If so, invite them to meetings, show interest in them by giving a little of your time to prepare them for National membership. By helping the E-I-T, you are helping yourself. That is one of the things you get out of your Society. You all as engineers take great pride in creating. Here is the chance to help create a better engineer and a better profession. Once you have created an inanimate object, it remains that way until its usefulness is over, but create a better engineer and he will keep on growing — his usefulness will never end.

Do you know that out of a total of 1775 members, we have only 74 E-I-T's, or only 4% of our total membership; whereas a live organization should have an understudy for each active man in the organization. Why can't you bring in an E-I-T and make him your responsibility? The satisfaction you will get out of a job well done will be worth the effort.

4. Bring in the National member. Usually this is the man who is registered but just has too many other things to do and can't find time to join. He is the one who expects all the privileges but can't find time to help the profession. He is just *too damned busy!* Some of these men are critical of the organization and the men who give of their time and finances to build a strong organization where he can speak his own mind and help govern his organization. We need these men even though they are busy. We need them for the good of the organization and their own good.

Gentlemen, it is much later than most of us think. The trend toward unionization is spreading to the engineering profession — to promote collective wage and salary bargaining. How can a union which levels all wages or salaries improve the engineer's status without hampering his freedom of thought and action? Unionization reduces all men to the common level of the lowest man in his ranks. Is this good for the traditionally independent-minded engineer who enjoys rising by his own capabilities? The answer should be a big unqualified *No!* Therefore, bring in these registered men. Let them help us. Let us fill the ranks with individualistic men so that we can fight for the elevation of the engineer to a true professional status.

Remember — "Each member bring one new member" and keep the members we now have. Don't desert us now

just as we are beginning to see the light. It is a long hard pull, but the doctors and the lawyers did it. Why can't the *engineers*, who are just as intelligent and capable and necessary, become professionals in the same category. Let us make it "We — not just I — did a job in 1953."

We can do a good job pulling together (me — I can't do it without your help). Each membership chairman should take things into his own hands, work with the program and publicity chairmen of the Chapters and run individual membership drives. On the inside cover of the ILLINOIS ENGINEER you will find the name and address of the various membership chairmen. Thank you all!

EARL W. MARKWARDT, *Chairman*
K. C. HOEGLUND, *Co-Chairman*

VAN PRAAG SPEAKS BEFORE ST. CLAIR CHAPTER

Mr. Alex Van Praag spoke before a dinner meeting of the St. Clair Chapter on April 16, last. His subject was, "Unity of the Profession."

Loren Krause, Vice-President of the Chapter, is to head the committee making plans for the 69th Annual Meeting of the Society which is to be held in East St. Louis.

PROPOSED AMENDMENT FAILS OF ADOPTION

Board of Direction

Illinois Society of Professional Engineers

Gentlemen:

Upon direction, the members of the Tellers' Committee appointed by President Spicer to count the ballots on the Constitutional Amendment dated January 17, 1953, and presented to the membership in the February issue of the ILLINOIS ENGINEER, met on March 17 and report as follows:

For adoption of the amendment — Yes, 22.

Against adoption of the amendment — No, 4.

Total Vote — 26.

Respectfully submitted,

W. J. ROBERTS, *Chairman*

BEN F. MUIRHEID

C. DALE GREFFE

Trouble is a sieve through which we sift our acquaintances; those who are too big to pass through are friends.

There never was a person who did anything worth doing, who did not receive more than he gave. — Henry Ward Beecher.

69th Board of Direction, Rock Island, March 28, 1953



First Row: John Henline, J. L. Mills, C. W. Klassen, R. G. Brichler, A. D. Spicer, G. L. DeMent, L. I. Osborn. Second Row: P. E. Roberts, H. F. Sommerschild, W. D. Mitchell, W. S. Gray, F. L. Dunavan, John Duguid, L. S. Ryburn, L. J. Keenan, L. S. Pappmeier, D. E. Dreier, R. W. Kastner, J. R. Gardner, G. H. Shanahan, W. E. Gronberg.

Chicago Chapter News

CHAPTER MEETING MINUTES

The regular April chapter meeting was called to order on April 9, 1953 at 7:15 p.m. by Chapter President, Engineer John Dolio, P.E., ISPE, in the meeting room at the Western Society of Engineers, 84 East Randolph Street, Chicago, Illinois. There were 27 members and guests present for both dinner and the meeting.

Secretarial Report

Due to the illness of our Chapter Secretary-Treasurer, Engineer Allen Drachman, P.E., who was not present, it was regularly moved, seconded and passed, that the reading of last meeting's minutes be not read, and that Chapter Vice President, Engineer K. C. Hoeglund, act as Secretary-Treasurer, pro tem.

Committee Reports and Announcements

National Affairs

Engineer Al Streicher, P.E., raised a question concerning the EJC's position, regarding their claim to represent all engineers on a National basis, and some lively discussion followed. It was pointed out by Engineer Frank Edwards, P. E., that the EJC consisted primarily of a superstrata of officials, acting as a council, and that they did not represent the individual members of any of the several member societies.

State Affairs

The newly appointed IEC Representative, Chicago Chapter Membership Chairman, Engineer John Duba, P.E., was called upon to present some information regarding the new State of Illinois House Bill No. 108, which provides the setting up of a Commission to study the many involved problems concerning highways, sewers, water, garbage collection and related problems in and for the entire greater Chicago area. This Commission would act and be a fact-finding body charged with reporting to the General Assembly of the State of Illinois in 1955.

It was regularly moved by Engineer Fensterle, P.E., and seconded by Engineer Gunlock, P.E., that the Chicago Chapter, ISPE, endorse the passing of this bill. Considerable discussion followed concerning the general purpose and activities of this Commission. The consensus of Chapter opinion present was that the purpose of the Bill was good and that this Commission had no power, excepting that of fact-finding.

Engineer Virgil Gunlock moved to amend Engineer Fensterle's motion to the effect that a report on our actions be sent to the Committee in charge of reporting on this Bill. The amendment was seconded by Engineer Edwards and carried. The original motion to endorse passing of HB No. 108 was then voted on and carried.

Chapter Affairs

It was suggested by Engineer Fensterle, that perhaps a Greeting Committee for the Chicago Chapter would

help to increase our regular meeting attendance. Engineer Fensterle was appointed chairman of this committee after regular motions had been made and carried to have such a committee. Engineer Tony Scheidt, P.E., and Engineer Leo Spurling, P.E., were appointed to serve with Engineer Fensterle.

Special Topics and Announcements

Chapter President John Dolio called on Engineer C. J. McLean, P.E., to ask the Question of the Evening (a regular meeting feature) which must be answered by all those present with either yes or no after rising and giving their names. The Q.E. was, "Do you think there will be peace in Korea within the next six months?" The vote was recorded at 9 yes, 18 no.

Speaker Program

Chapter President John Dolio called on National Director George Dement, P.E., to report on the ISPE Annual Meeting which was held at Rock Island on March 26, 27 and 28, 1953. Engineer Dement gave a detailed day-by-day report of the many long and difficult sessions held during this Annual Meeting.

On Thursday, March 26th, the old Board of Direction met and heard the many annual reports.

On Friday March 27th, the annual meeting of the General Membership was held. The Exploratory Committee, which was Chairmanned by our Board of Direction member, Chapter Representative Harold Sommer-schild, P.E., made a report to the Board of Direction and considerable discussion took place. Engineer Dement then read to us the revised report of this Committee. Next, Engineer Dement read to us a report made by the outgoing ISPE Secretary-Treasurer Harold Babbitt, P.E. Engineer Dement then related and described the discussions and actions taken by the General Membership.

On Saturday, March 28th, the new ISPE Board of Direction met in the morning and continued in session until 3:30 in the afternoon. At this meeting, for the first time in many years, a nomination was made from the floor for the office of ISPE Secretary-Treasurer, in addition to the one made by the Nominating Committee. The vote was 15 for Past President, Engineer A. Douglas Spicer, P.E., and 5 for Engineer John Duba, P.E. Also at this meeting, both Engineer Lee Osborn, P.E., Kewanee, Illinois, and Engineer George Dement, P.E., Chicago, Illinois, were elected as National Directors. President-elect R. G. Brichler, P.E., named Chicago Chapter Vice President; K. C. Hoeglund, P.E., as Co-Chairman of the State Membership Committee.

Speech Discussion

Engineer Frank Edwards followed Engineer DeMent with a few comments concerning the ISPE Annual Meeting. He pointed out that the Board of Direction meeting

(Continued on page 11)

"Recent Atomic Developments"

R. J. KRYTER, Treasurer, The Esterline-Angus Co., Inc.
Indianapolis, Indiana

(Presented at 68th Annual Meeting)

The following article is presented in the form of notes as used by Mr. Kryter in presenting his address, "Recent Atomic Developments," before the Annual Meeting of the Society in Rock Island on March 27, last. The Editor has changed them only where necessary to make clear the sense. To a certain extent, this form of presentation expresses the pungency of Mr. Kryter's statements. On the other hand, however, it is impossible to carry his dynamic personality through the printed word.

These notes are printed at the request of persons who heard Mr. Kryter but wanted further opportunity to consider his statements. It is hoped that those who did not hear him will also find them of interest.

Introduction

1. Past two years have been time of vast expansion and feverish development. This talk is a sequel to "Atomic Power in War and Peace," and a progress report.

2. Four phases of atomic activity: 1) Weapons. 2) Useful Power. 3) Man-made radioactive materials. 4) Theoretical developments.

Fundamentals

1. Fundamentals as previously described in "Atomic Power in War and Peace," all unchanged. Started with discovery of radioactivity by Becquerel in 1896, and radium by Mme. Curie in 1898, 55 years ago. Foundations laid in Europe, but practical release of atomic energy achieved in America in 1942 and 1945. Product of Free Enterprise. Material of dime, all converted into energy, would blow Empire State Building 52 miles into air. One pound of U in release explosive force equals 10 thousand tons TNT, or heat equivalent 1800 tons (3,600,000) pounds) coal. — Built vast plants during war to separate explosive form of Uranium (U_{235}) and to make new explosive element (Pu). Atomic processes release energy, produce lethal radiation and dangerous radioactive byproducts.

Size of Atomic Program

1. Atomic program is BIG business. Two billion dollar Manhattan Project biggest investment by man in single undertaking up to that time, but now small. Collapsed after war. Rebuilt by AEC, but not back in high gear until 1949.

2. Original Y-12 electromagnetic plant at Oak Ridge cost \$427 million, later abandoned. Expansion program began in 1949 with \$300 million at Hanford for enlarged improved atomic piles. Original K-25 gas diffusion plant at Oak Ridge cost \$600 million, but three subsequent additions to plant (last in 1951) raised cost of diffusion plants at Oak Ridge to \$880 million. \$464 million complete new gas diffusion plant at Oak Ridge now (1952-53) under way, will bring investment in gas diffusion method at Oak Ridge alone to \$1350 million.

3. New gas diffusion plant at Paducah, Ky. Cost of plant as originally planned \$475 million. Original plant to be served by two power plants, one TVA and one

private (combination of 5 utilities) each generating 500,000 KW, or 1 million KW total. Now plant to be doubled in size. Addition will cost \$469 million more, doubling capacity, and involving investment of \$950 million. Electric Energy, Inc., at Joppa, Illinois will increase capacity from 500,000 to 900,000 KW, and TVA will increase from 500,000 to over a million KW. Total capacity to serve plant will be 1,940,000 KW. In winter 1952, 23,000 construction workers on job.

4. New "Savannah River Works" in s.w. South Carolina, near Aiken, S. C. (about 30 miles from Augusta, Ga.), being built by DuPont to produce H-bomb materials (probably Tritium or H_3). Originally estimated to cost \$900 million, latest AEC estimate \$1250 million. Winter 1952, 45,000 construction workers on job; now more. In December 1952, 315 sq. mi. area closed to public. Will probably be largest single plant ever built, probably greatest single physical undertaking of man.

5. Additional gas diffusion plant in Pike County, Ohio (just north of Portsmouth) estimated to cost \$1200 million. (Actual cost probably higher.) To be operated by Goodyear Tire & Rubber. Total power load will be 1,000,000 KW from two steam generating plants with total capacity of 2,200,000 KW. One plant in Indiana near Madison (engineered by AG&E) of 1,200,000 KW capacity, and one in Ohio near Gallipolis (engineered by Sargent & Lundy) of 1,000,000 KW capacity. Plants will cost \$440 million, built by combination of 15 electric utilities. Power to be transmitted by Indiana plant 330,000 volts. Madison, Indiana generating plant will be largest power plant in world. Will burn 10,000 tons coal per day. Two power plants will have 50% greater capacity than all capacity of Detroit, will have 75% capacity of all New York. Will burn 7.5 million tons of coal per year! 30,000 construction workers needed.

6. New gas diffusion plant in Ohio, plus doubled plant at Paducah, Ky., plus total gas diffusion installations at Oak Ridge, will bring investment in gas diffusion method to 3.5 billion dollars. Probable reason: published data indicates U_{235} costs only 1/10 as much as Pu.

7. OSRD and Manhattan District of U. S. Engineers in eight years (1940-47) spent $2\frac{1}{4}$ billion. AEC, six years (1947-52) spent $4\frac{1}{4}$ billion. Entire expenditures, 13 years (1940-52), \$6.5 billion. Expansion program

started 1952, called for \$6 billion more, equal total expenditures of previous 12 years. Atomic construction now (Spring 1953) running \$90 million per month, and by 1st quarter 1954 will be \$175 million per month! When expansion completed, plant investment about \$10 billion. — End of 1951, \$2.5 billion plant investment, exceeded all real estate, plant and equipment of General Motors. When present program completed, \$10 billion investment will be twice General Motors plus U. S. Steel. AEC largest enterprise in world.

8. All planning, construction and operation behind iron-clad secrecy curtain. Taxpayer cannot know where money goes, or how used, or what results obtained. Some secrecy necessary, but greatly overdone. An ominous aspect.

New Weapon Developments

1. Rapid expansion in quantity, variety and methods of use. AEC says "significant advances were made in weapons research and development." Original Hiroshima bomb 20 kilotons (equal 20,000 tons TNT) levelled city of 350,000 people big as Louisville, Ky. Eniwetok tests in 1949 disclosed 100-kiloton bomb, 5 times Hiroshima size. Eniwetok test, May 1951, showed "destructive capacity in excess of any weapon previously exploded." Reputed about 8 times Hiroshima size, or 160 kilotons. At 40 tons per carload, 160,000 tons TNT would be 4000 carloads, or 40 mile-long trainloads.

2. Eniwetok tests 1951 probably indicated H-bomb feasibility. Eniwetok tests Nov. 1, 1952 probably exploded prototype H-bomb. Greatest man-made explosion in history. Tests surrounded by extreme secrecy, because of revolutionary character, and because tests far exceeded expectations. AEC referred to test as having "high and sombre significance." Bomb expected to be 1 megaton, or 50 times Hiroshima size. (Unofficially) reported to be 3.5 megatons, or over 150 times Hiroshima size. Test island disappeared. Such bomb should have 100 sq. mi. blast damage area (11 mi. diameter), and 150 to 200 sq. mi. heat flash damage area (14 to 16 mi. diameter). Thinking now in terms of "absolute weapon" 10 megaton bomb, equal 10 million tons TNT.

3. Nevada tests 1951 covered new bomb types and new conditions. Proved smaller bomb available in large numbers for tactical use, and prototype of atomic artillery shell. Probably included underground burst. Tests in Nevada and Arizona in spring 1952 further proved practicability of small tactical bombs. Atomic gun (280 mm. bore, or 11 inches) built and already tested with conventional shells. Will fire first atomic shell spring 1953. Small bomb probably possible by increased efficiency, lowering critical mass. Probable minimum critical mass 1945, about 20 or 25 pounds. Probable present minimum critical mass, 6 pounds. Small tactical bomb and atomic artillery give greater number of atomic explosive units, and wider possible use.

4. How about Uranium supply? Production plants under way and projected, said to go to limit of raw

material supply. Supply said to be tripled. Bulk of U still from Shinkolobwe in Belgian Congo and Great Bear Lake region in Canada. New finds in Canada and New Mexico, and very large but low-grade deposits in Colorado. Colorado said to be second-largest supplier. U as by-product from phosphate fertilizer in Florida. Phosphate rock contains .2-.4 pound U per ton, or .01-.02%. U produced as by-product of gold refining in South Africa, 14 plants. Cost, with power plants, \$100 million, and new finds in Australia at Radium Hill and Rum Jungle. New feed materials plant at Fernald, Ohio, near Cincinnati.

Military Atomic Power

1. Electric Boat Company, Groton, Conn. building hull of "U.S.S. Nautilus." Keel dedicated June 1952. Ship to be ready for test early 1954. Argonne Lab at Chicago has designed reactor, and Westinghouse at Pittsburgh has contract for reactor and power plant. Plant being tested at Arco, Idaho. (Will be "thermal" reactor with water as heat transfer medium) — Second sub already started, "U.S.S. Sea Wolf." GE has contract for reactor and power plant. (Will be "intermediate" reactor using molten metal as coolant.) Reactor and power plant will be tested in portion of actual submarine hull, inside of 240-ft. steel sphere near West Milton, N. Y. for safety protection. — Atomic submarine will be unparalleled Naval weapon, able to stay submerged weeks or months (human endurance tests now under way — spring 1953) and able to run year or more without refueling. Will be answer to Russia's schnorkel sub fleet.

2. In July 1952 Westinghouse given contract for nuclear power plant for "large Naval vessels" like aircraft carriers.

3. Progress on nuclear-powered plane. Consolidated-Vultee has contract for air-frame, and GE has contract for nuclear power plant. Project has moved from study and planning stage at Oak Ridge, to design and development stage at GE's Lockland, Ohio (near Cincinnati) plant. — Boeing has contract for second air-frame, and Pratt & Whitney for different type atomic engine. Test facilities for aircraft propulsion reactors now being built at Arco, Idaho. — Planes probably bigger than B-36, probably able to girdle globe non-stop, and to stay aloft several days at full cruising speed without refueling.

Radioactive Weapons

1. Possible use of radioactive poisons as weapons. Gas masks and protective clothing little protection. A-bomb exploded on ground can scatter radioactive poison. A-bomb exploded in harbor can make coast city uninhabitable. H-bomb, if large enough and properly rigged can blanket whole state with radioactive poisonous gas. Poisonous radioactive fission products from atomic piles can be used for "Dust of Death" to make cities uninhabitable. See statement by Hans Thirring (Note A). Also possibilities of radioactive incendiaries and poison gases (Note B).

Foreign Activity

1. Russia has now exploded three A-bombs. First announced Sept. 23, 1949, probably occurred July 1949. Other 2 in 1951. Explosion dates and type of material known. Russian output of atomic materials increasing, and work of scientists respected. Russia reported to have 100-150 A-bombs now; 200 to 250 at end of 1953; 400 to 600 at end of 1956. But published guesses indicate our bomb production five times Russia's, with ratio increasing. If we have produced H-bomb, Russia will follow; probably within 2 years.

2. Great Britain has produced their own A-bomb. Plutonium plant in operation in 1951, and first bomb detonated October 3, 1952. Tested on Montebello Island off n.w. coast of Australia. British scientists claim bomb "more efficient than any produced in U. S." Bomb detonated inside battleship moored in harbor, with most of ship vaporized. Tests reported as working "strictly according to schedule." Indicates Britain can "call her shots," design, produce and use her own atomic weapons.

3. Canada reported producing U_{233} and separating from parent Thorium. Thorium several times more abundant than U. If practical on large scale, will greatly increase fissionable material supplies.

4. Eight atomic reactions now known outside of U. S. and USSR. Canada has most efficient reactor to date (NRX pile at Chalk River), and planning improved and more powerful one. Great Britain planning three new piles in June 1952. One for marine propulsion.

Current Status on Activity

1. Forty nuclear explosions to date (April 1, 1953). First at Alamogordo, N. M., July 1945. Total of 36 by U. S. One — New Mexico, 2 — Japan, 2 — Bikini, 22 — Nevada and Arizona, remainder Eniwetok. 3 — Russia, 1 — Great Britain.

2. New tests for spring 1953 started March 17, will include first firing of atomic gun with actual atomic shell. Single shell said to produce "complete destruction" over 2-mile circle. Gun tested and fired previously, but not with atomic shells. — To get data for Civil Defense.

The Atom in World Situation

1. We are reputed to have stockpile of approximately 1000 A-bombs now, with Russia probably having 100, and not over 150. At conclusion of present expansion program (end of 1956), U. S. should turn out 500 atomic bombs or shells or missile warheads per year. By 1957, should be able to fight full-scale atomic war. Will have enough large strategic bombs to wipe out all Russia's major centers, and enough small tactical bombs or shells to use at front line against troops and fortifications. Production atomic piles will give material for large quantities of "Dust of Death." Will surely have atom-powered subs, possibly atom-powered carriers. Might have atom-powered planes, but less likely.

2. Atomic sub is answer to Russia's schnorkel fleet. Atomic sub will have greater speed, will be able to oper-

ate submerged many times longer, and operate remote from fueling base. — Similarly, tactical A-bomb and atomic artillery will answer Russia's manpower superiority. Russia's traditional method is tremendous manpower concentration, ruthlessly applied and sacrificed. Such concentration can be wiped out by A-bomb. Only protection is dispersal, which makes concentrated manpower use impossible, plus additional protection of digging in, which largely destroys mobility. Tactical A-bomb thus neutralizes Russia's vast manpower advantage.

3. Thirring's statement that war danger is diminishing (Note C). Churchill's warning: "Be careful above all things not to let go of the atomic weapon until you are sure, and more than sure, that other means of preserving peace are in your hands." Note reference not to war, but to "preserving *Peace*."

Atomic Power

1. After World War II, atom hailed as new source of power. But power program sidetracked due to unfavorable economics, limited materials supply, and technical difficulties. Program revitalized by Korean War and Russian A-bomb development. Atomic power needed for subs, carriers and planes, "packaged" power supply units would be extremely useful to Military in regions like Alaska where fuel is limited, or for use where existing power supply facility is destroyed.

2. First practical recovered power heated building at Harwell, England in 1951. First recovered *electrical* power was in U. S. in December 1951 from breeder pile at Arco, Idaho. Power generation was incidental; main purpose to test new pile design, and cooling by molten metal. — Britain expects to build first *commercial* atomic power house in world. Canada has set target of *ten years* for atomic energy to be fed to existing electric power grid.

3. Each pound U_{235} = 1800 tons, or 3.5 million pounds coal. 100,000 KW plant working 24 hours a day at full load would use only 500 pounds U_{235} per year. — Note usefulness of atomic power plant where fuel not available or highly costly. U. S. Army Engineers now studying possibilities of nuclear power plant as power source for military operations in remote areas.

4. "Breeding." Breeding essential to *economical* use of atomic power. Present piles use only U_{235} component, which is 1/140 of natural U. If breeding made completely efficient, would multiply U supplies, for power purposes, 140-fold. Breeding thus essential for economical power generation.

5. Atomic power highly concentrated and requires new techniques. Canada's "NRX" pile at Chalk River extracts 10,000 KW from reactor core 8 feet in diameter. "Breeder" pile at Arco, Idaho has active core no larger than football. Heat release 7 times maximum achieved in high-powered Naval boiler. (Naval boiler, 0.6 KW per cubic inch; turbo jet combustion chamber 0.7 KW per cu. in.; breeder reactor 4 KW per cu. in.). Extremely high heat transfer rates require cooling in liquid metal. Construction materials must maintain strength at high

temperatures, and not damaged by radiation, and not absorbing neutrons. Zirconium found useful, and now produced on large scale, solely for atomic use.

6. Four industrial groups (each electric utility plus chemical concern or consulting engineer) has studied practicability of industrial piles. Four original groups later joined by two others, and in fall 1952 by 11 additional power companies. — First group was Monsanto Chemical of St. Louis and Union Electric of Mo. Second group was Dow Chemical and Detroit Edison. This group submitted first report, and has worked presently in most advanced stage. — Monsanto-Union Electric propose dual purpose reactor to produce Plutonium and power. Dow Chemical-Detroit Edison plan strict power pile (breeder) to consume its own Plutonium. First studies complete, now working on specific designs with three different type reactors considered. Ready to produce atomic power plant in one year, using own money. Dow-Detroit Edison most optimistic of all groups, and only group to recommend private enterprise for entire job without Government subsidy. — Comments of Dr. Grebe on Power possibilities (Note D).

Man-Made Radioactive Materials

1. Great increase in pile-produced radioactive isotopes. Isotopes for research produced in U. S. both at Oak Ridge and Brookhaven. Isotopes from Harwell, England distributed over continent, and now distributed in U. S. A. through Nuclear Instrument & Chemical of Chicago. — Norway — Holland research pile started August 1951, now producing isotopes for Europe. France has second pile (1500 KW — heavy water type) producing isotopes for Europe. U. S. no longer has monopoly.

2. Canada's "NRX" pile at Chalk River neutron flux density 20 times that of Hanford piles. Produces high activity material. (Used by Eli Lilly of Indianapolis as source radioactive carbon for C-14 "labeled Histamine"). Source of high-intensity materials for cancer treatment. Pile to be superseded by new reactor "many times more powerful."

3. For medical use (cancer) radium and high-voltage X-rays being replaced by synthetic radioactive materials. Several available: Cobalt 60, Cesium 137, Europium 152-154, Strontium 90, Tantalum 182, and Lanthanum 140. These materials (particularly Radio-Cobalt and Radio-Cesium) will probably replace Radium as stocks of material produced and techniques develop. — Deep therapy for cancer with "Cobalt bomb." Four Cobalt wafers, each 1 inch dia. by $\frac{1}{8}$ inch thick weigh total 2.5 ounces, but equivalent to more than 3 pounds Radium. Cost of Cobalt 10 to 20 thousand dollars. Equivalent Radium \$25 million dollars. — Cobalt 60 source delivered to Stanford University, equivalent 10 pounds Radium!

4. Use of intensely radioactive fission products from reactor. Sources of terrific amounts of radiation. (Small amounts useful for activating luminous signs, as starting ionizers in fluorescent lamps, and for static elimination.)

Large amounts useful for cold sterilization of drugs and biologicals (antibiotics, vaccines, serums) which are sensitive to heat, and the sterilization of foods. Milk sterilized by radiation kept 3 weeks at 77° F. Enormous amounts of penetrating radiation available at low cost from fission products which currently have no use.

5. "Tagged atoms" used in industry to study lubrication, corrosion, mechanical wear. Will make possible great advances in automotive and aviation fields. Used to measure flow in pipe lines, level of materials in inaccessible tanks (molten iron in foundry cupola at Ford), thickness of materials, etc. Important use: mechanism of chemical reactions, particularly catalysts. — Extreme sensitivity of isotope measurements. Canadian tests on paper making .8 microgram, I_{131} (1/30 of millionth of ounce) distributed through three and a half tons paper, with area of 600,000 sq. ft. (20 football fields). — Extreme sensitivity, ability to tag atoms from different sources, ability to recognize atoms of same chemical species from different sources, makes possible studies of measurements impossible by any previously-known method.

6. Peace-time blessings of atomic knowledge will probably come from use of tagged atoms. More foods, more knowledge of nutritional needs, more knowledge of action of drugs and bodily processes. Some day may solve riddle of chlorophyll.

Fundamental Theoretical Research

1. Continuous, wide-scale research to learn fundamental nature and structure of atomic nucleus and forces at work within it. Reason for study of cosmic rays, and for gigantic particle accelerators. (Cyclotron only a start). New "Cosmotron" at Brookhaven has already developed energy of 2 billion electron-volts. New principle developed by which hope to make energies of 100 billion electron-volts available.

Conclusion

1. Responsibility of scientist and engineer. (Note E)

2. Atomic program reaches into life of every American citizen. Unprecedented cost, vast scale of operations, number and variety of organizations involved, and world-shaking implications of new powers available, involve every citizen. Past three years feverish development of new weapons and devices, and vast expansion of physical plant. This development and plant expansion will continue through 1953, probably to 1956. New, more potent, more numerous, more versatile atomic weapons hold great peril. Atomic power, atomic by-products and new knowledge hold great possibilities. New research, leading to understanding of fundamental nature of matter. — Atomic weapons have revolutionized basic concepts of warfare with changes of balance of power not yet evaluated. Power of atomic forces and weapons thoroughly respected by all nations. Very magnitude of these forces and recognition of tremendous possible destruction, may prevent holocaust we fear.

NOTE A. *Professor Hans Thirring*, Director of Vienna Institute for Theoretical Physics.

With regard to use of dust made poisonous by radioactive by-products, from atomic piles, says "A city may be considered uninhabitable if it is so radioactive that people who stay in it for 4 weeks will die of radiation sickness. This level does not require much activated dust. If, in a few decades, only 10% of the power in U. S. is generated by atomic piles, the stock of radioactive material which may be used for contamination of an enemy country will suffice for making an area of 3000 sq. miles uninhabitable." This area is 150 times the area of Manhattan Island (22 sq. miles) and is more than the area of all the large cities of Europe combined.

NOTE B.

U. S. Patent applications assigned to AEC cover "Radioactive Toxic Incendiary Compositions," "Radioactive Toxic Chemical Warfare Agents," and "Radioactive Toxic Ammunition." Radioactive incendiaries would produce radioactive fires leaving radioactive ash and craters and yielding radioactive smoke. Burns from such fires pose great medical problems, and a highly radioactive fire would be fought only with great difficulty and danger. Chemical poison gases and smokes can be made radioactive, making them much more hazardous and more difficult to combat. These materials can be used in existing shells, rockets, bombs, mines and torpedoes of conventional design. Conventional explosives or incendiaries or poisons would be used, with additional radioactive poison effect. These are entirely distinct from atomic explosives.

NOTE C. *Professor Thirring* of Vienna, in open letter to Dr. James Conant of Harvard, wrote in January 1952:

"Paradoxical as it may sound, I regard the existence of these dangerous weapons as a benefit to the world. Of course, the catastrophe of a new world war would be gigantic. But precisely because of this dreadful danger — because the threat of atomic weapons spoils the appetite of warmongers — the possibility of another world war has been reduced to a fraction."

NOTE D. *Dr. John J. Grebe*, of Dow Chemical Company, speaking to section on industrial and engineering chemistry of International Congress of Pure & Applied Chemistry, September 1951, stated:

"The average nuclear energy potential in the uranium and thorium of the world's continents is equivalent to 20-50 pounds of coal per pound of earth. In some land masses, such as Allegheny Mountains in U. S., the average is 10 times as great." He believes that as our nuclear technology advances, energy from atomic fuel will become cheaper than energy from coal. He asserted that "Mankind ultimately will benefit far more than it will suffer, from the practical utilization of the atom."

NOTE E. *Dr. Arthur H. Compton*, new Chancellor of Washington University, and former scientific director of Manhattan Project (on 10th anniversary of first operation of atomic pile) said "Scientists created a weapon that put an end to the most disastrous war in history. The bomb has established a balance of power in the world that so far has prevented a third world war.

"We who had the might of the atomic nucleus in our hands would have been traitors to mankind had we refused to build bombs and use them with tempered blows.

"The great significance of nuclear energy seems to me to be a source of useful power, a field which has hardly yet begun to open up. *Here I should consider its eventual importance to mankind to be hardly less than that of fire.*"

SPECIAL REPORT ON TAFT-HARTLEY TESTIMONY

From N.S.P.E. Legislative Bulletin

Friday, March 27, 1953, was "Engineers' Day" before the House Committee on Education and Labor, which is hearing testimony relative to amendments to the Taft-Hartley Act. Because of the importance of this subject in general, and the special interests of the engineering profession, this bulletin is devoted completely to a summary of the proceedings.

Three basic presentations were made to the committee by engineering groups. First, the Labor Legislation Panel of eight national engineering societies, including NSPE, recommended retention of the present professional provisions of the law. Next, NSPE in a separate presentation, advocated an amendment to the law to permit all professional engineers of a company, regardless of their supervisory or non-supervisory status under the law, to affiliate in a single organization for the purpose of considering common professional problems. Finally, the Engineers and Scientists of America testified in favor of the present professional provisions of the law and further advocated amendments to outlaw professional groups containing both supervisory and non-supervisory personnel, to give federal employees the right of full collective bargaining, to repeal the present decertification provisions, and to redefine "supervisor" so that more engineers in industry would be eligible for union membership. The major portion of the questions by members of the Committee were withheld until the completion of the three separate presentations and all the witnesses were subject to questioning at the same time.

The Present Provisions

The testimony in favor of retaining the professional provisions of the law, which guarantee to professional employees the right of separate vote in determining the question of representation, pointed out the background which led to the adoption of the provisions in 1947 and

their retention in 1949 when the act was subject to modification.

The statement, presented by E. L. Chandler, chairman of the joint Labor Legislation Panel, declared that prior to the Taft-Hartley Act no recognition was accorded the special problems of the professional employees and consequently they were often submerged into larger non-professional groups against their will. The provisions of the law obtained to alleviate this situation have been eminently successful and have not worked to the detriment of any group, it was observed. A number of cases were cited illustrating the operation of the provisions, from which it was concluded "that any impartial review of the operation of the professional provisions will clearly indicate that they have been justified by past experience, they have worked to the advantage of all who have been affected and to the disadvantage of none and that they have truly promoted the basic concept of freedom of association which is inherent in the law."

The NSPE Position

Clarence T. Shoch, Vice President and Chairman of the Legislative Committee of NSPE, told the Committee that in addition to strongly supporting the retention of the present professional provisions, NSPE favored a further amendment of the law to resolve a serious problem within the profession. He pointed out that under the law, as it stands today, engineering personnel of the same employer are not free to effectively operate uncertified associations or committees if these groups contain both supervisory and non-supervisory personnel, as such groups may be deemed to fall within the definition of "labor organization" and held to be subject to the domination of the employer through the presence or activities of the supervisory engineers. These types of organizations, which do not operate as unions, or desire to do so, are therefore seriously handicapped in attempting to discuss and resolve professional problems, he said. "It is respectfully submitted that associations of professional people should not be compelled to make the choice between functioning as a union on the one hand, or of taking no common interest or concern in professional matters which may involve economic problems or conditions of employment. If these associations desire to function as advisory in character, or merely as means of communicating the consensus of the thought of their members, they should be privileged to do so without running the risk that the Government would order them disestablished," the Committee was told. "It is believed to be inimical to the interests of the great majority of professional employees, and the interests of the country, to continue legislation which exerts strong pressure fostering such a stratification of a major profession." (The full text of the NSPE statement will appear in the next issue of the *American Engineer*.)

The ESA Proposals

The engineering union viewpoint was presented by Joseph Amann, president of the newly-organized Engi-

neers and Scientists of America, accompanied by the union's counsel, Henry Mayer. The ESA witnesses favored retention of the present professional provisions but urged the following changes in the law:

1. Limit the definition of the term, "supervisor" in order that engineers without responsibility for company policy be eligible for "employee," and hence union status.

2. Provide that employers should be prohibited from dealing with other than legitimate unions on the subject of wages, hours and working conditions. This recommendation was directed against the type of organization which the NSPE testimony stated should be permitted to exist to consider the general professional problems of groups of engineers.

3. The protection of the Act should be granted to employees of public agencies and wholly owned government corporations.

4. Deletion of the "free speech" and decertification provisions of the law; elimination of the provisions which provide for the imposition of state laws on union security and check-off systems, and authorizing labor unions to be free to bargain, without restraint or limitations, on all matters affecting the employment relations, such as union security and welfare funds.

CHICAGO CHAPTER NEWS

(Continued from page 5)

held on Thursday, March 26th, had an unusually large turnout in that 21 of the 25 Board members were present at the opening meeting at 8:15 a.m. He also related that after the election of A. D. Spicer, P.E., as ISPE Secretary-Treasurer, the Chicago Chapter made a statement to the Board of Direction, pledging the full support of the Chicago Chapter to the several new ISPE State Officers.

It was regularly moved, seconded and passed that the Chicago Chapter write a letter to the members of the Exploratory Committee, expressing our gratitude and commendation for the work they did, both prior to and at the Annual Meeting of ISPE, and our Chapter Secretary-Treasurer, Engineer Allen Drachman, was to be instructed to write this letter.

Adjournment

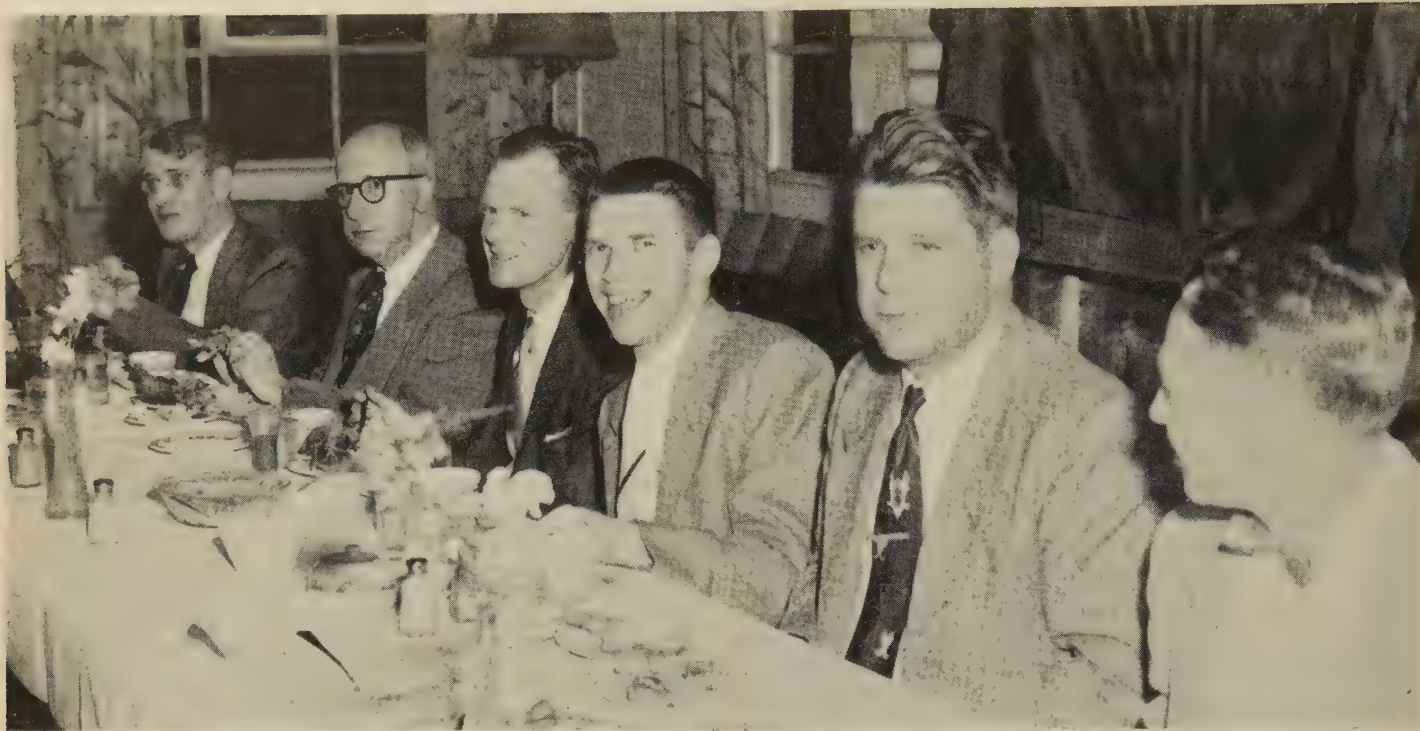
Chapter President John Dolio asked for meeting adjournment, which was regularly moved, seconded and passed at 8:40 p.m.

ENGINEER ALLEN DRACHMAN, P. E.
Secretary-Treasurer,
Chicago Chapter, ISPE

by

ENGINEER K. C. HOEGLUND, P. E.
Vice President,
Chicago Chapter, ISPE
Secretary-Treasurer Pro Tem

Champaign County Chapter at Petro



The group shown at the head table during the dinner of the Champaign County Chapter held at the Kaskaskia Country Club shows from left to right: Edward M. Anderson, one of the consultants on the Petro water supply, Harold E. Babbitt, Secretary Emeritus of the Illinois Society, W. J. Roberts, President of the local chapter, Frank Anderson, Sanitary Engineer and Zone Supervisor of the Petro Plant, James M. Allen, Personnel Director, and Ralph Brown, Extraction-Fractionation Technologist for Petro-Chemicals.

CHAMPAIGN COUNTY CHAPTER VISITS PETRO PLANT

(Prepared by W. J. Roberts)

Fifty-one members and guests of Champaign County Chapter drove to Ficklin on April 2 for a tour of the new National Petro-Chemicals Corporation plant west of Tuscola.

When the party arrived at the Operations office of the plant they found two school buses waiting for them. The group was divided and half went in one bus with Jim Allen, the Plant Personnel Manager, and the second half went in another bus with Frank Anderson in charge.

The buses were routed past each of the separate plants on the 350-acre installation. At each plant a specialist in that particular phase of the work came aboard the bus and described in detail the operation and physical layout of that plant. There were 12 of these technologists who provided this information. In addition, Frank Anderson conducted tours of the water treating plant and the water supply development which was designed and constructed under the direction of Wilson & Anderson, Consulting Engineers, Champaign, Illinois.

At 5:30 the buses returned the groups to the Administration Building where they boarded automobiles for a short run to the Kaskaskia Country Club where a country-style chicken dinner was served to the group at 6:30 p.m. After dinner Ralph Brown, who is in charge of the extraction and fractionation plants, introduced each of the technologists who had presented data during

the afternoon. Members asked these technologists various questions and a long period of lively discussion took place which lasted until about 9:30.

The tour was a wonderful experience for Illinois Society members and their guests and it provided an opportunity for good fellowship with the chemical engineers at the new Petro Plant.

President Roberts of the Champaign County Chapter thanked the Petro Officials for the wonderful time they had given the group and in acknowledging thanks Jim Allen, the Personnel Director, invited the group back at a later date when the plant will be finished and in operation.

This is the second field trip the Champaign County Chapter has enjoyed this year. The trip to the Harmattan Mine near Danville brought out a large group and many members regretted being unable to make the Petro-Chemicals tour because of previous engagements. It is expected that field trips of this caliber will form an increasingly larger feature of the programs put on by Champaign County Chapter.

LET'S GO BACK TO THE THREE R'S

The following editorial from Power magazine is pertinent reading in view of the controversy that is raging between the classicists and the proponents of modern educational methods in the various colleges of education. The fact, as stated in the editorial, that high school students are not prepared in mathematics, chemistry and

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physics, to enter engineering schools is only one result of the trends of modern educational methods in our secondary schools. Neither are they properly prepared in history, government nor literature as good citizenship requires.

EDITOR

"NAMBY-PAMBY EDUCATION"

"One reason for today's shortage of engineering graduates is too much namby-pamby education in our high schools. Right now only 20% of all high school students take mathematics. Only 12% enroll for chemistry and a mere 5% for physics.

"Any way you look at it, this high school neglect of math and science is bad. Take the common case of the boy who goes directly from high school to industry. Everything he touches there is grounded in the physical sciences. Why must he go out into the world as a complete ignoramus in such matters?

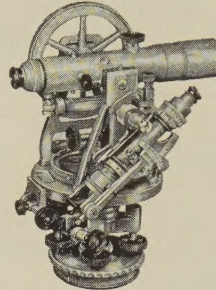
"It's even worse if the boy is set for college and also has the makings of a good engineer. Again and again it happens that he reaches his senior year in high school only to discover that he hasn't the credits he needs to enter an engineering college. Situations like this could be avoided if guidance teachers would guide more promptly and more wisely.

"In a world that is built on science why don't the high schools wake up to the need for more attention to the scientific fundamentals? One reason is that the whole fiber of our secondary schools has been weakened by soft

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educational theories. The idea seems to be to protect the poor dears from all forms of hard work.

"Fortunately a number of the hard-headed groups see the danger and are campaigning for more sense in secondary education. These include the American Society for Engineering Education, the Edison Foundation, the American Ordnance Association, the Engineering Manpower Commission, and the National Electrical Manufacturers' Association.

"Says NEMA's Committee, 'In our present modern-day living, when our factories, homes and farms are so highly mechanized, studies in math and the sciences are a must for all high school students. Schools should teach our youth to work and think in terms of the scientific era in which they will live their adult lives.'

"What's going on? Are we training men or milksops? You engineers of America can do much to cure this evil in your home towns. Why not join the crusade? How about some friendly talks with the high school teachers in your own home town—also with some of the boys in high school to make sure they are getting the right guidance? Then talk it over with your fellow parents in the PTA.

"And keep in mind that the aim isn't merely to stockpile enough engineers for America's future needs. Giving the boys a break is just as important. That means giving every boy a sound start and leaving the road to an engineering career open to all who should go that way."

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ACCURACY

Board Chairman H. W. Phelps of American Can has this to say about accuracy: "Accuracy does not come by chance. It is a positive thing, sometimes a painful thing. Carelessness is so much easier — careless observation, wishful thinking, inaccurate listening, lazy mental habits, indifference. In industry, accuracy, more than any other one thing, has made possible high speed combined with high quality. Similarly, the vast enterprise which is our nation must depend for its salvation on the care and accuracy of responsible citizens. It cannot achieve unity or direction on gossip or hearsay. The answer to most problems which beset us today as individuals and as

a nation is constant, unrelenting care. Is it too much, then, to demand of others that they be accurate in whatever information they may convey to us? Or to demand of ourselves the utmost care against error in our statements to others who may depend upon us for reliable information?

N. M. Professional Engineer

I know of no safe depository of the ultimate powers of society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion by education.

— THOMAS JEFFERSON, 1820

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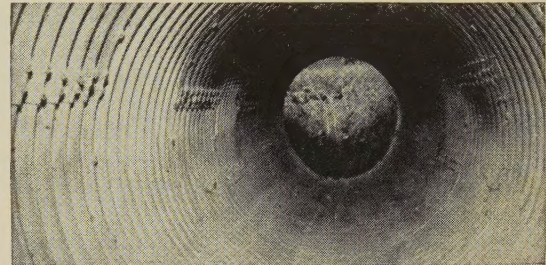
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OVER THE MANAGER'S DESK

May is the month that nature blossoms out in full glory. Will this be the month your engineering department blossoms out with those new products or new ideas they have been working on? Will this be the month you will blossom out with that new job you have been dreaming about?

If you as an employer or an engineer are unable to say "Yes" to either of those questions, then May should be the month you contact your E.S.P.S. office at once and make the Staff blossom out with real "Service" for you. B. H. A.

MEN AVAILABLE

Designer. Chem. Eng. 27. Some previous drafting and field work. \$3900. Midwest. 606-PE

Elec. Engr. E.E. 41. Eight yrs. design, drafting, and layout of electric motors, switchboards, control panels, and power plant equipment. Midwest. \$6000. 607-PE

Const. Supt. 32. Ten yrs. designing, specs. writing, and drafting for architectural and industrial firms. \$7500. Chicago. 608-PE

Designer. C.E. 23. One yr. Surveying, Structural analysis and design on roads, ditches, and bridges. Also eight mos. architectural drafting. Midwest. \$5900. 609-PE

Development. M.E. 31. Three yrs. layout drafting, design, and development work for special devices. Two yrs. production routing, flow diagrams, cost work and some timetudy on road and sanitation equipment. \$4800. Midwest. 610-PE

Field Engr. Arch. Engr. 25. Twenty-two mos. drafting, design, surveying and laid out pile foundations for three tall buildings. \$4000. South. 611-PE

Field Engr. C.E. 31. One yr. design and detail of steel storage tanks. \$5000. Midwest. 612-PE

Time Study Engr. M.S. M&I.E. 34. Six yrs. in charge of assignment servicing clients in wage incentives and labor standards, methods, plant layout, control. Seven mos. charge of establishing production rates. \$9600. Midwest. 613-PE

Supt. I.E. 33. Two yrs. 6 mos. supervising all quality control activities, hire and train help. Two yrs. three mos. completely organize quality control department. \$10,000. Midwest. 614-PE

Ind. Mgmt. Eng. A.B. 50. Five yrs. Ind. Engr. doing time study, methods, cost estimating, preparing of processes, setting and

formulation of labor standards. \$5000. Chicago. 615-PE

Gen'l Mgr. 52. Twenty-five yrs. supervising manufacturing, production, sales, advertising, engineering and purchasing of metal products. \$12,000. Chicago. 616-PE

Chief Engr. M.E. 41. Three yrs. designing electrical heating, plumbing, and air conditioning systems. Thirteen yrs. charge of personnel, operation and maintenance of high pressure electric generating station. \$6600. South. 617-PE

Ch. Draftsman. 38. One yr. supervise and check work of drfts., for chemical, petroleum plant and boiler house. Four yrs. construction drawings. Five yrs. plant layout, and remodeling. \$550. Chicago. 618-PE

Chief Drfts. M.E. 44. Two yrs. chf. drfts. charge office and design of chemical plants. Eight yrs. estimate, purchase, design and construction of plant equipment. Salary: \$9000. Midwest. 619-PE

POSITIONS AVAILABLE

Design Engineer. E.E. Degree. Age: 25-40. 5 yrs. exp. electrical engineering. Would prefer motor design experience but may accept other electrical design exp. Duties: electrical design of d-c machines ½ h.p. to 200 h.p. Some customer contact and quality control supervision of units going through shop. For an electrical manufacturer of electrical motors. Salary: \$7200-\$9000. Location: New Jersey or Iowa. T-9812

Systems and Procedures Engineer. Age: to 40. Indus. Engrg. or Business Management schooling. At least 5 yrs. exp. with metal working company. Ex. with a consultant engineering firm good. Time study knowledge helpful. Exp. in Production Control, Material Control, Material Handling and IBM necessary. Duties: Make recommendations, write procedures and follow thru on installation of office and plant systems and procedures. Salary: \$450-\$525. Company will pay ½ of fee now and 6 mos. later reimburse applicant for balance. Loc: Chicago. R-9811

Asst. Ed. or Assoc. Editor. deg in Eng. Age: 20-30. Prefer engr. who has written freelance articles on engrg. material for technical press dept. Knowl. of magazine editing and engrg. Duties: prepare original articles and edit submitted tech. articles mainly in mechanical engrg. field for 2 of company's magazines. Order art work and engravings to illustrate articles assigned him. Travel to obtain stories and attend conventions, etc. An asst. ed. now working for another engrg.

type mag. or an assoc. ed. who wants to change jobs considered. Company can offer larger sal. and more respon. In short, man with engrg. degree preferring and has slanted his career toward editing. Ind. exp. desirable but not mandatory. Employer will pay fee. Loc: Michigan. T-9810

Sales Engineer. Electrical training. Able to work with tools and do service work as required on signaling systems. Duties: developing sales of industrial and commercial signaling systems such as fire or police alarms by calling on architects, engineers, contractors and users. Will lead into general sales and field engineering work. For a manufacturer of signal systems. Salary: up to \$400 per month depending on exp. Car furnished. Location: Chicago. R-9808

Recent Graduate. Civil. Age: 22 plus. 0-2 yrs. exp. preferably in structural drafting. Duties: first 30 days training in real estate department learning requirements; then on drafting board for about 1 yr. Then in field on construction and inspection of service stations for large oil company. Must be a citizen. Salary: \$350. Emp. will negotiate the fee. Location: Chicago. R-9807

Sales Engineer. 30-35 yrs of age. Mechanically inclined, preferably grad. engr. and considerable sales exp. Applicant will go thru a training period of a year or 2 in general office here in Chicago. Necessary due to type of equipment manufacturer. Must be above average in appearance and personal background. For manufacturer of shovels, cranes and draglines. Salary: open. Loc.: Chicago. R-9806

Designer. Elect. Must have degree in electrical engineering and three (3) years exp., or eight (8) years exper. with no degree. Exp. shall include design and layout of lighting, power and control systems for commercial and industrial buildings. Employer will pay fee. Salary: open. Location: Chicago. R-9804

Sales Engineer. Grad Elect. Age: to 35. 2 plus years exp. in control application or design. Duties: sales engineering of control panels to manufacturers in metropolitan Chicago area. Will have to make own layouts. Salary: \$350-\$500. Employer will negotiate fee. Traveling. Loc: Chicago. R-9801

Sales-Service Engineer. Chem. Eng. Chem. or M.E. Age: up to 30. Recent graduates of better with sales aptitude and able to handle field work. Duties: Training for service and sales in chemical field. For a manufacturer of chemicals. Salary: \$325 to \$600 per month. Considerable traveling. Car furnished. Loc: U. S. R-9800